

21st Century Weather Decision Support Service for the Aviation Community:

The Total Integration of Weather into the Decision Making Process

Brandon Smith/Jeffrey Tongue
National Weather Service
WFO New York



Where we were...

W. und O. Wrights Gleitflugstudien.

115

- WFO NY hosted an aviation conference in 2008 that showed a rather large disconnect between the NWS and the FAA/Airlines
- Efficient communication between the NWS and FAA was lacking
- Clearly, the NY/NJ/PA airspace was the source of the majority of delays in the National Air Space

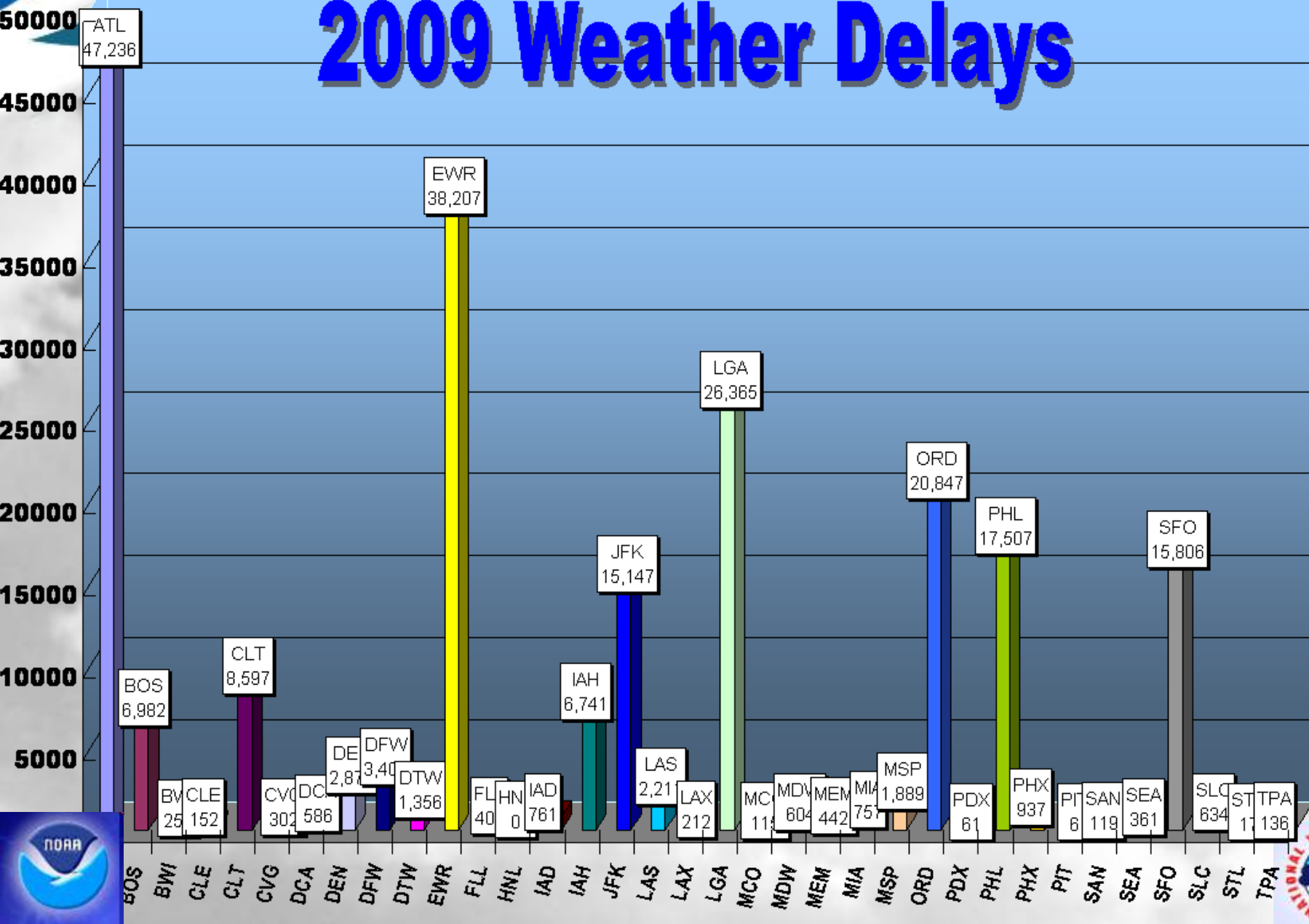


Abb. 29.



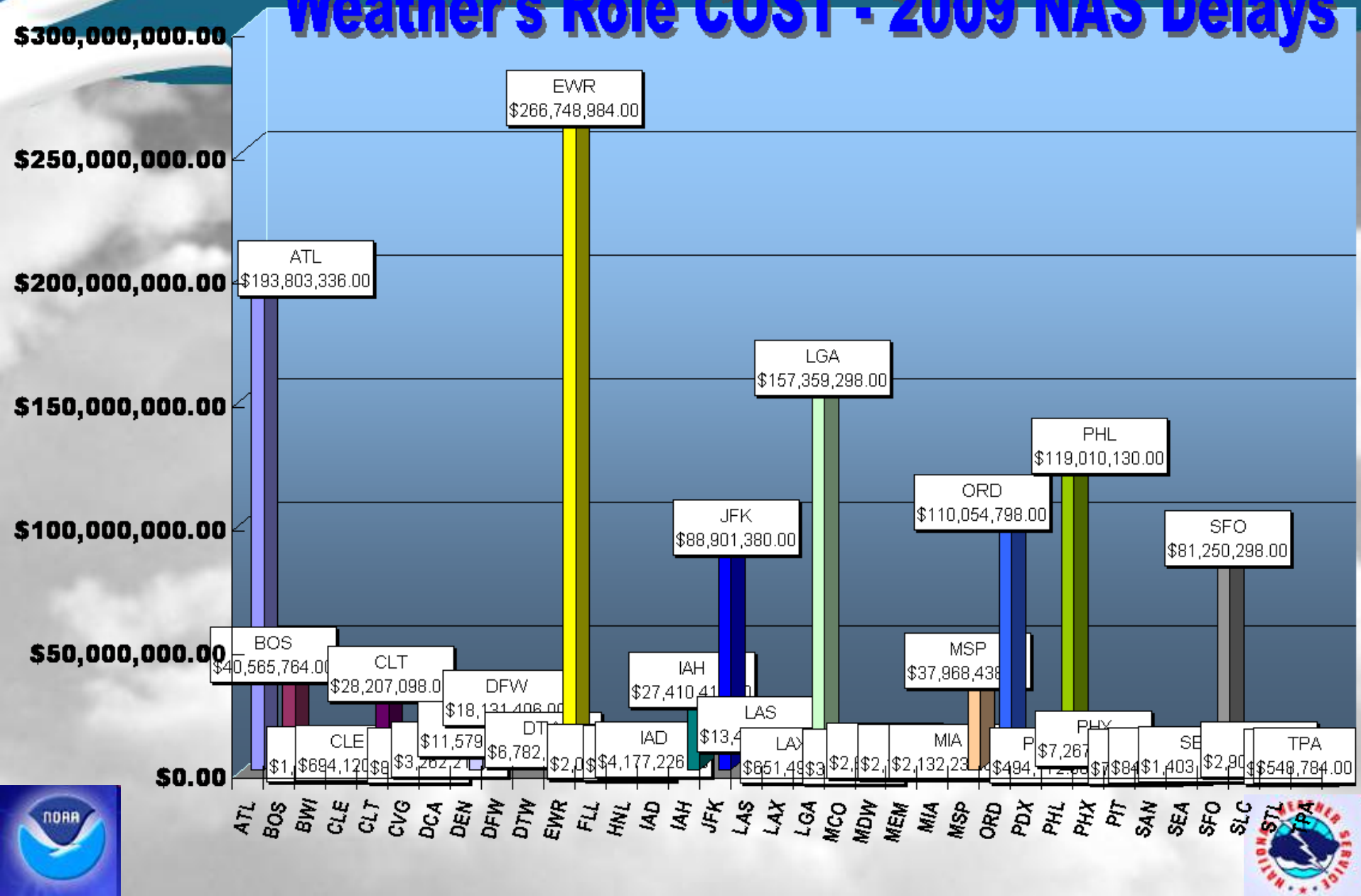
The Problem...

2009 Weather Delays



The Problem...

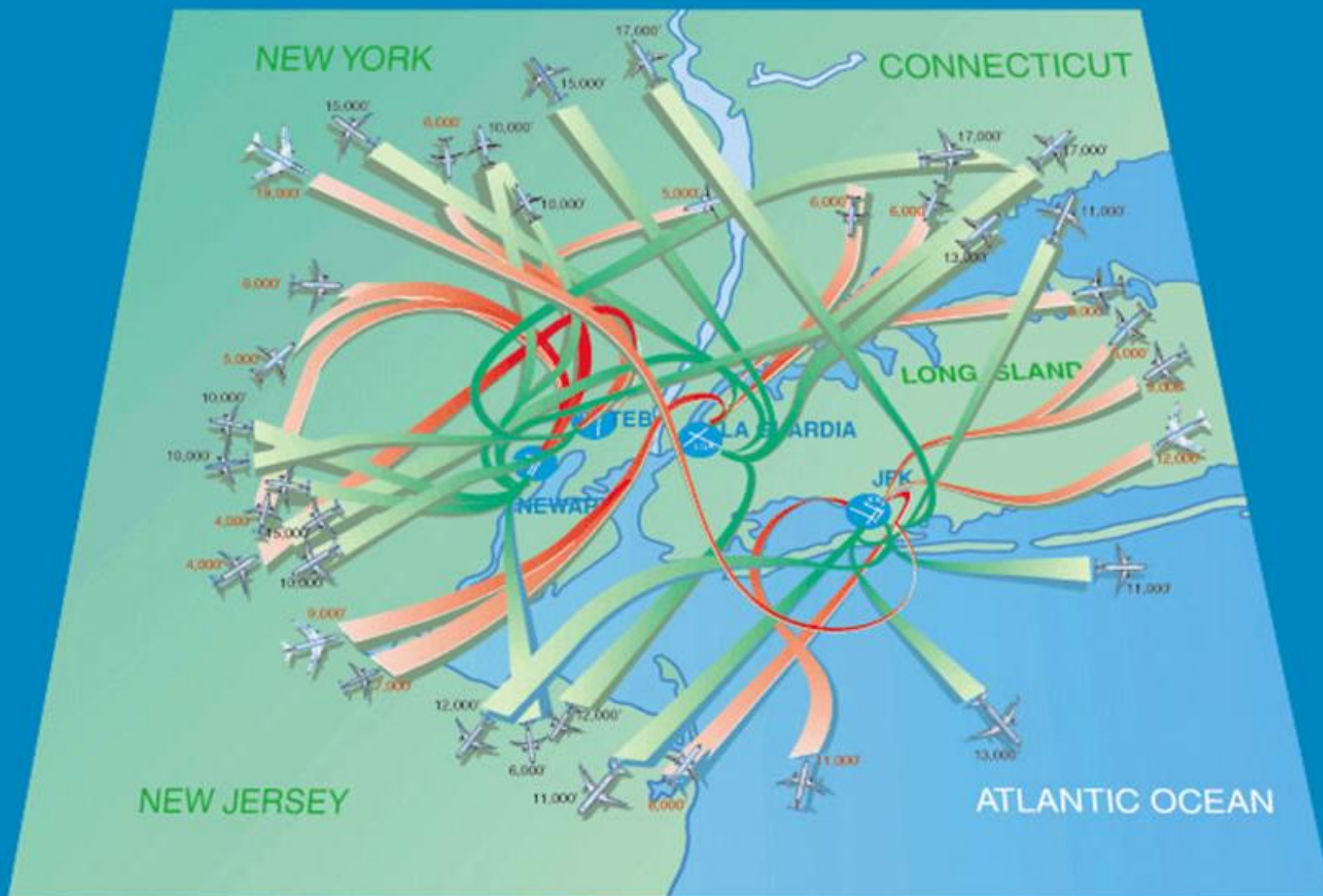
Weather's Role COST - 2009 NAS Delays



Why it's a problem



Major Air Traffic Pathways - Existing South Flow

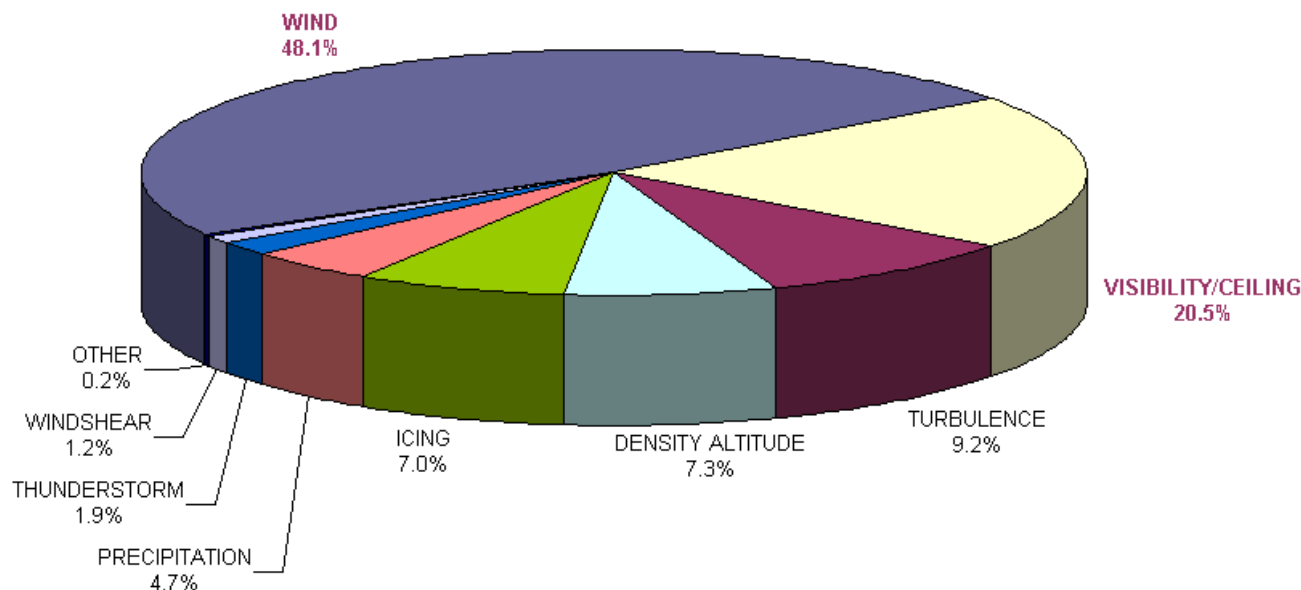


It's not just low ceilings or visibility weather that causes weather problems...

NTSB WEATHER RELATED ACCIDENTS BY WEATHER CONDITION 1994-2003

Selecting a red highlighted condition will link to a breakout and distribution of related sub-conditions

19,562 TOTAL ACCIDENTS



Between 1994 and 2003, there were 19,562† aircraft accidents, involving 19,823 aircraft. Weather was a contributing factor in 4,159 of these accidents and involved 4,167 aircraft. This chart identifies the breakout of weather conditions involved in the 4,159 accidents.

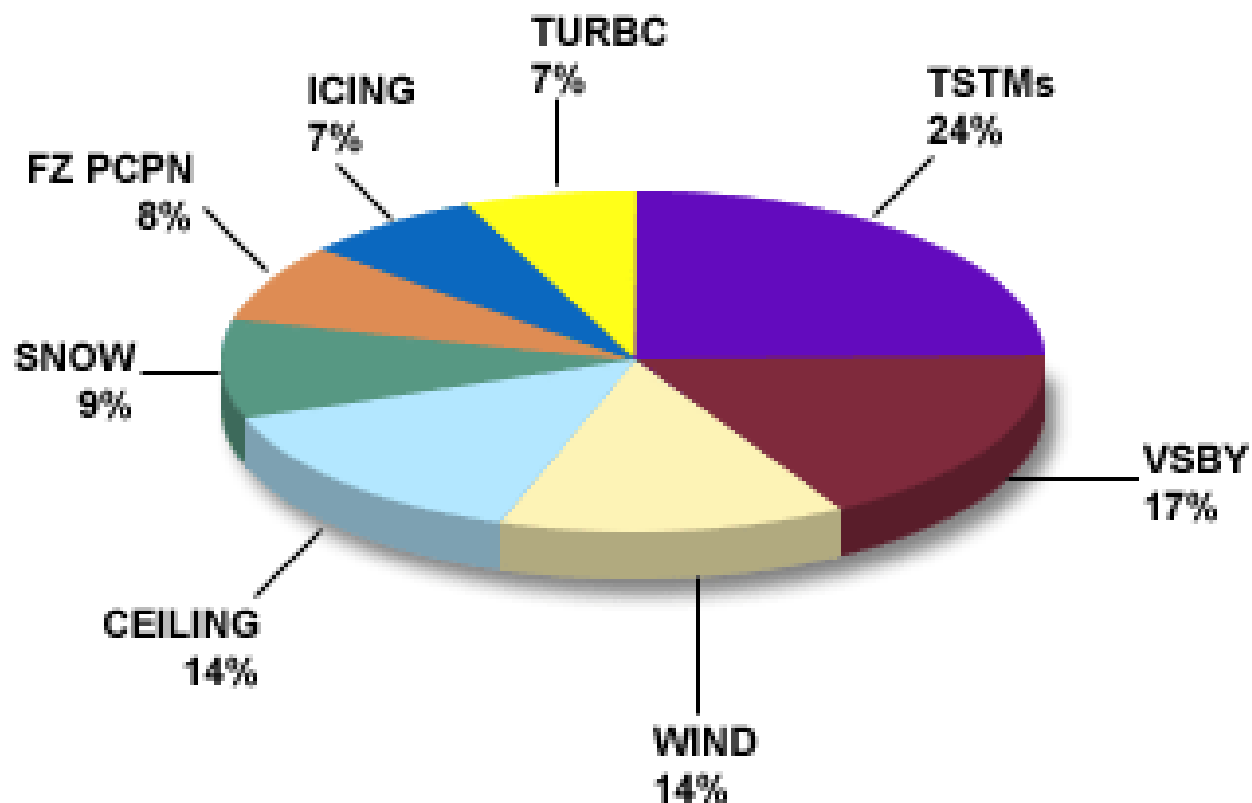
† Accidents include final reports only where causal factors were identified.

§ A single accident may involve multiple weather conditions.



Wise is the meteorologist who knows which way the wind is blowing...

Rankings of Impact to the NAS by Significant Weather Elements



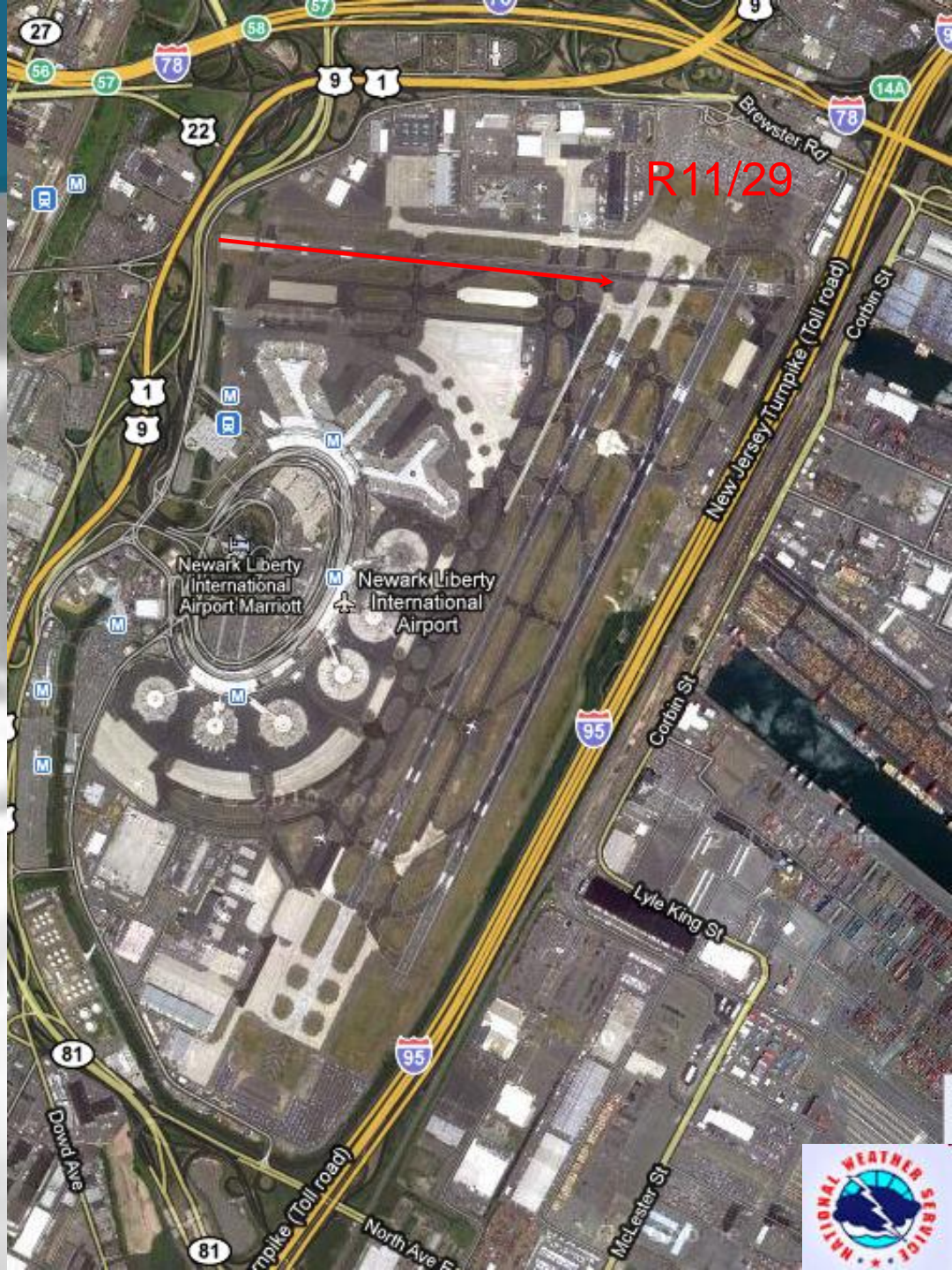
Newark/Liberty has 2 primary runways...R4/22LR

R11/29 is primarily used for “overflow” (primarily commuter aircraft)”

There are so many scheduled operations at EWR, that “overflow” is built into the system (ie, R11/29 is used everyday!

A NW wind restricts the use of R11 (Tailwind is bad).

Guess which is the most common wind direction at EWR???



What we did...

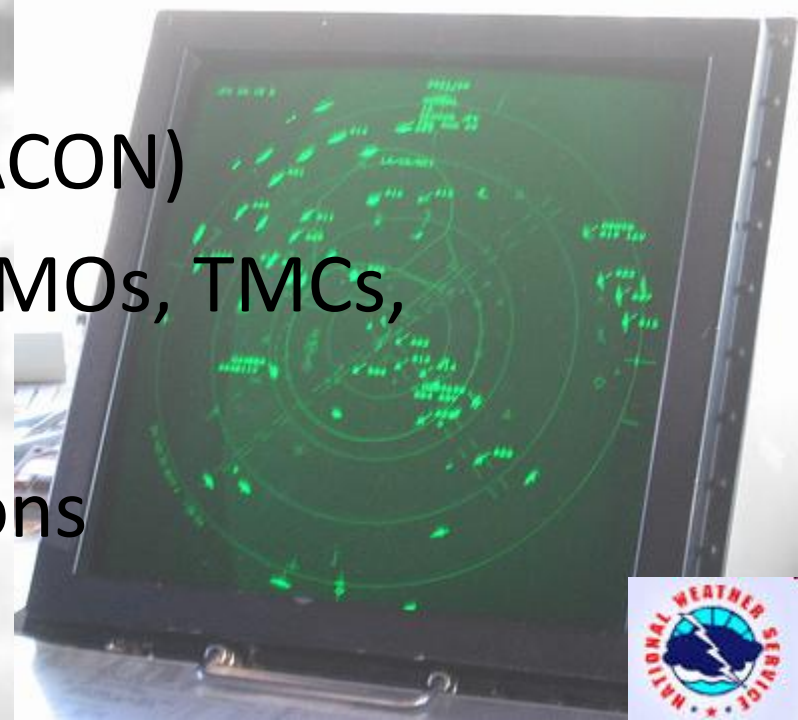
- 60 day “demonstration”, to show the FAA we could help mitigate weather-related air traffic delays in the NY/NJ/PA Airspace
- Significantly improved communication with the FAA
- Tailored products



What we did...

Marketing! (outreach)

- More **visits** to high impact towers to promote demonstration (EWR, JFK, LGA, TEB, HPN)
- Multiple **visits** to N90 (NY TRACON)
- Provided **training** to STMCs, TMOs, TMCs, and FLMs at towers and N90
- **Participate** in daily recap telcons



What we did...

Teamwork...

- ER MSD – policy development and Liaison to NWS HQ.
- RAM – marketing, outreach and training
- WFO – put the ideas into action.



60 Day Demonstration

- Dedicated AVN forecaster for 16 hours a day, 5 days a week (due to staffing limitations)
- Participation in daily strategic planning Telcons
- Success based on customer feedback (as well as TAF verification/SOD)



Tailored Products

- 3-hourly TAFs and implemented Categorical Amendment Criteria
- Comments for each TAF site were added to the AFD. Focus was on forecast uncertainty (where the TAF could go wrong)
- Hourly wind forecast (derived from NDFD grids and hand edited by the forecaster)



Area Forecast Discussion

- .AVIATION /07Z TUESDAY THROUGH SATURDAY/... -- Changed Discussion -- HIGH PRESSURE BUILDS INTO THE REGION TODAY. VFR. WITH A SW FLOW AROUND 10 KT DEVELOPING IN THE AFTERNOON. SEA BREEZE DEVELOPMENT EXPECTED ALONG THE COAST.

NY METRO ENHANCED AVIATION WEATHER SUPPORT... DETAILED INFORMATION...INCLUDING HOURLY TAF WIND COMPONENT FCSTS CAN BE FOUND AT: [HTTP://WWW.ERH.NOAA.GOV/ZNY/N90](http://WWW.ERH.NOAA.GOV/ZNY/N90) (LOWER CASE)

KEWR FCSTER COMMENTS: LOW CONFIDENCE WIND FORECAST AFT 19Z AS SEA BREEZE FRONT EXPECTED TO BE CLOSE TO TERMINAL. WINDS MAY BE MORE SE THAN FCST. AMENDMENTS POSSIBLE.

(SHOWS UNCERTAINTY IN WIND FORECAST!!)



How did we do??

- TAF verification improved (more on that in a bit)
- More importantly, the FAA and Airlines learned more about what we do, and we learned more about them
- Relationships were developed...and our products are used in planning rather than to react!



Feedback

FAA

- **ATCSCC** – “To whom it may concern, My name is xxx and I work at the ATCSCC/WX UNIT. I just wanted to let you know that the detailed terminal forecast that you have been faxing to us for the last month or so is, too me, a valuable tool for our concerns.”
- **N90 STMC** - Cyndie wanted us to know that they'll be shortening to 22Z based on the AVNN90 product that they got.

AIRLINES

- **Continental** - "As stated earlier, Continental Airlines found this experiment to be highly beneficial. The increased resolution of the winds forecast was very highly prized at our ATC coordination desk. In fact, I was often asked on the weekends where the info was, and when the experiment ended, the data was missed.”
- **United** – “...the EWR hourly winds are excellent info. All other products look great, especially the TS chart and the vertical wind forecast.”





Verification WFO New York

- Wind Speed Improvement
 - 13-17 knots 4% improvement
 - 18-22 knots 9% improvement
 - **23-27 knots 38% improvement**
 - **28-32 knots 52% improvement**
- Wind Direction Improvement
 - N 2% SE 1%
 - NE 26% W 4%
 - E 40% **NW 17%**
 - Overall 10%





Verification

WFO New York

- Probability of Detection (POD): IFR and lower
 - 2008 0.70
 - 2009 0.78
 - **11% improvement!**
- False Alarm Rate (FAR): IFR and lower
 - 2008 0.35
 - 2009 0.28
 - **20% improvement!**
- WEATHER RELATED DELAYS have decreased!!



Enhanced Aviation Support

3 WFO's nationwide are Providing new enhanced aviation support (NY along With Chicago and Atlanta).



Together, these three cities are considered the “**Golden Triangle**”...i.e. the busiest airspace in the U.S.



Where we are now

- 3 new forecasters added at WFO New York (4/2010)
 - Dedicated AVN Forecaster 16 hrs a day/Mon-Fri
 - 4 am through 8 pm (although enhanced services last a bit longer)
 - Continuously evaluating products to ensure they meet the needs of the customer
 - ITWS is used by the forecaster

ITWS Winds. Magnetic - subtract 13 degrees for True

JFK

LGA

EWR

31

AW 010 04
31RA
31RD
31LA
31LD

A31-D04

AW 010 04
31 A 020 06
31 D 010 05
04 A CALM
04 D CALM

northeast-flow

AW 020 04
04LA
04LD
04RA
04RD



Where we are now (WFO NY)

- NWS Communication with N90 (NY TRACON)
 - 3 conference calls per day
 - SPT's every 2 hours
 - When TAF Changes Significantly.
 - 30 Minutes Prior to Significant wind shifts (Towers too)



Enroute (CWSU ZNY)

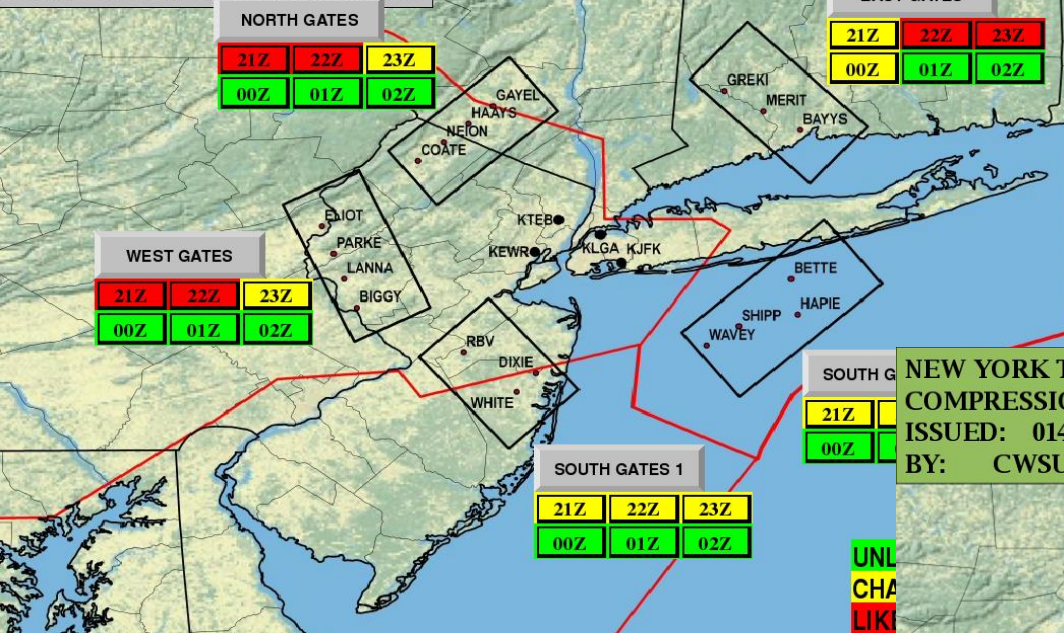
- Text Products
- Graphical Products
- Conference Calls
 - 0710 Day shift forecast with N90 and towers
 - 1030 Telcon with northeastern US Centers, TRACONS and major airport towers
 - 1510 Evening shift forecast with N90 and towers



Graphics – Web based

weather.gov/zny

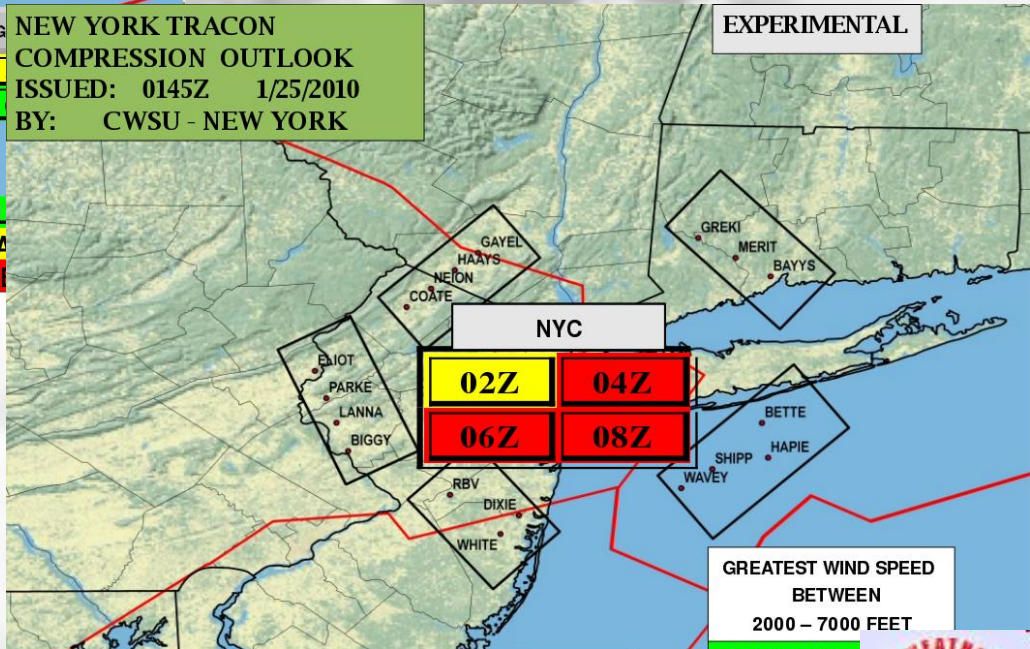
NEW YORK TRACON
THUNDERSTORM FORECAST
EXPERIMENTAL
ISSUED: 20:00Z 07/29/09
NEXT FORECAST: 23:00Z 07/29/2009



THUNDERSTORM
OUTLOOK FOR
TERMINAL GATES



NEW YORK TRACON
COMPRESSION OUTLOOK
ISSUED: 0145Z 1/25/2010
BY: CWSU - NEW YORK



COMPRESSION
OUTLOOK FOR
TERMINAL GATES



GREATEST WIND SPEED
BETWEEN
2000 – 7000 FEET

LESS THAN
30-50K
> 50K



NYC WIND DATA: WIND DIR: SSW
MAX WIND SPDS: INCRSG TO 55KTS AFT 03Z. 60-65KT BY 08Z AND
80-85KT BTN 13-16Z.....POSSIBLY 90-100KT BTN 050-070 FEET AFT 16Z.
SURFACE FLOW INCREASING FM SE-S OVERNIGHT BY 12-14Z WINDS
SE-S 25KT GSTS 30-35KT.



Graphics – The SPA

<http://www.erh.noaa.gov/zny/n90/>

SITE	CIG			VIS			Wx			WindS			WindG			RnWy	
Time-UTC	15z	18z		15z	18z		15z	18z		15z	18z		15z	18z		15z	18z
KJFK																	
KLGA																	
KEWR																	
KTEB																	
KHPN																	
KISP																	

AIRPORT: KLGA-NEW YORK LA GUARDIA AIRPORT

Updated: 9/28/2010 at 15:47

[View TAF](#)[View WFO/CWSU Discussion](#)

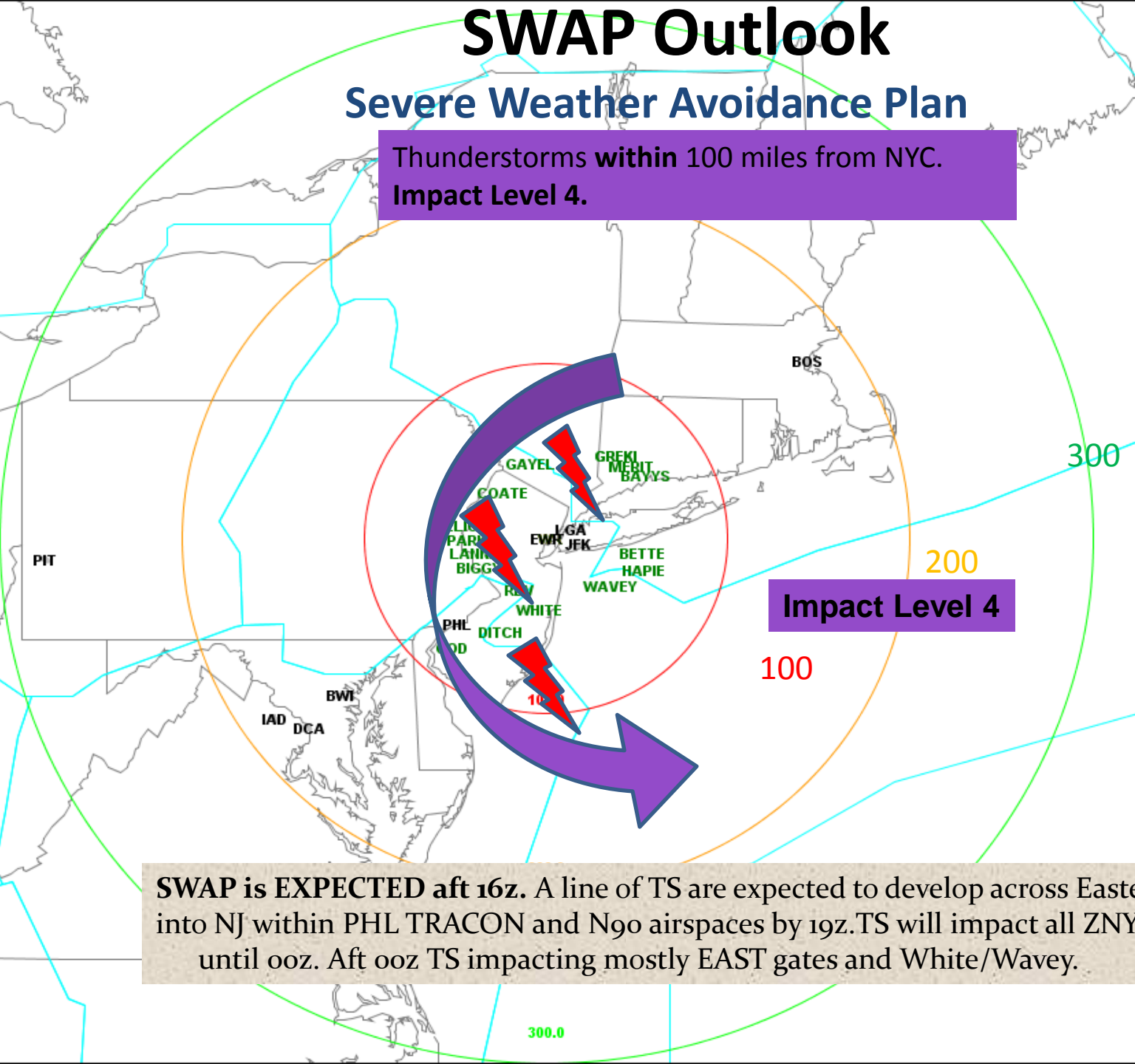
Hour-UTC	OB	16	17	18	19	20	21	22	23	0	1	2	3
CIG<5Kft	11	15 8CB	25CB	25CB	25CB	25CB	25CB	25CB	25CB	10	10	10	10
VIS-SM	10	>6 1	>6	>6	>6	>6	>6	>6	>6	>6	>6	>6	>6
WX	-RA	N +SHRA	SHRA BR	SHRA BR	SHRA BR	SHRA BR	SHRA BR	SHRA BR	SHRA BR	BR	BR	BR	BR
FLTCAT	M	M	M	M	M	M	M	M	M	M	M	M	M
WDIR	170	170	180	180	180	180	180	180	180	190	190	190	190
WSPD-Kts	14	17	15	15	15	15	15	15	15	11	11	11	11
WGST-Kts	21	28	25	25	25	25	25	25	25	11	11	11	11
R-X-T													
RY-13/31	R13-10-9	R13-13-11	R13-13-8	R13-13-8	R13-13-8	R13-13-8	R13-13-8	R13-13-8	R13-13-8	R13-10-4	R13-10-4	R13-10-4	R13-10-4
RY-4/22	R22-9-10	R22-11-13	R22-8-13	R22-8-13	R22-8-13	R22-8-13	R22-8-13	R22-8-13	R22-8-13	R22-4-10	R22-4-10	R22-4-10	R22-4-10

SWAP Outlook

Severe Weather Avoidance Plan

Thunderstorms **within** 100 miles from NYC.
Impact Level 4.

Level of Impact
1 - NIL
2 - LOW
3 - MEDIUM
4 - HIGH



Impact Level 4

SWAP is EXPECTED aft 16z. A line of TS are expected to develop across Eastern PA into NJ within PHL TRACON and N90 airspaces by 19z. TS will impact all ZNY routes until ooz. Aft ooz TS impacting mostly EAST gates and White/Wavey.

Thank you!

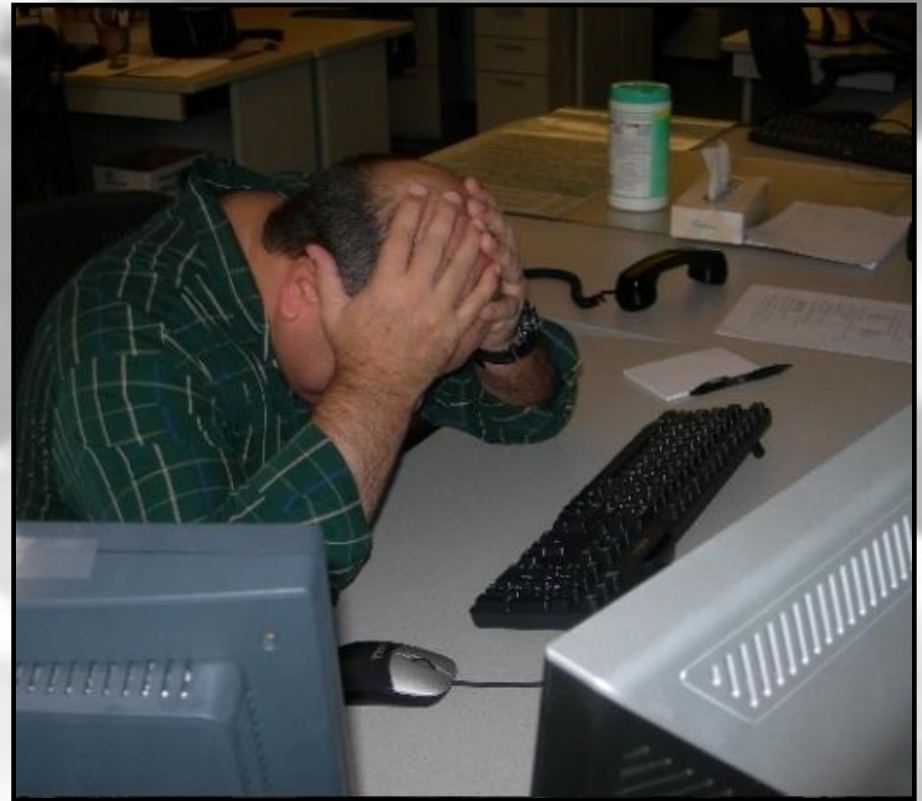
- Questions???

Jeffrey.Tongue@noaa.gov

Brandon.smith@noaa.gov

Strategic Planning Aid

<http://www.erh.noaa.gov/zny/n90>



Atlanta

- TAF amendments will be issued for ATL every two hours between the standard issuance times of 00Z, 06Z, 12Z and 18Z.
- AFDs will be updated for aviation information after each standard TAF issuance. **Forecaster confidence** will be a point of emphasis.
- NWSChat room between WFO, CWSU and Delta weather (i.e. collaborating on Delta TAFs)



Chicago

- Added an O'Hare and Midway specific paragraph focusing on forecasting uncertainty.
- CWSU developed a new webpage





JFK Runway Closure

Raised awareness at WFO and CWSU New York

Importance of wind shifts, thunderstorms, and sub-VFR conditions.

Critical values that impact operations have changed...

Not only the loss of a runway...but shortens the operational length of 13R/31L

